

WHAT IS THE LIMIT OF THE FUTURE EVOLUTION OF MAN?



HOW THE STEPS OF MENTAL AND MORAL EVOLUTION ARE SHOWN ON THE HUMAN COUNTENANCE.

PROF. ALPHRUS S. PACKARD, vice-president of Brown University, in his address before the American Association for the Advancement of Science, two weeks ago, opened up a most interesting field of speculation. At the end of a masterly discourse on the evolution of man from primitive fishes (which was published in full in the *Journal* last Sunday), Prof. Packard pointed out that evolution had not reached its culminating point in the civilized man of to-day.

What, then, he asks, may be expected of the civilized man of coming ages? As evolution goes on what progress and development may be expected of the human race in future centuries? If man as he exists to-day has developed from the lowest order of prehistoric fish, what mental, moral and physical triumphs may be expected in the ages to come?

Science has looked back to prehistoric times and traced the descent of man step by step through the various ages of the world's growth. It is now estimated that it has taken a thousand million years to develop a civilized human being from the earliest and lowest forms of animal life. The *Journal* last Sunday published the results of the researches of Dr. Haeckel, the great German biologist, and told how evolution, once a theory, has now become the universally accepted foundation stone upon which all modern science rests. The *Journal* to-day presents the forecasts of the future development of man as predicted by several eminent scientists and clergymen.

Professor W. J. McGee, of the United States Bureau of Ethnology of Washington,

THE ALMOST INCONCEIVABLE FUTURE DEVELOPMENT OF MAN.

From Professor Packard's address on "Evolution," before the American Association for the Advancement of Science:

"There is one fact in the doctrine of evolution to which, I may suppose, the common mind has not as yet become attuned, although evolution itself leads up to it, and, indeed, beyond it. It is simple, and yet its import is tremendous—almost inconceivable.

"It is this: 'IF MAN HIMSELF HAS BEEN EVOLVED FROM THE LOWEST FORM OF VERTEBRATE, AND THAT IN TURN FROM SOME LOWER FORM, AND SO ON DOWN THE DESCENDING SCALE, THE ARGUMENTATIVE HYPOTHESIS WOULD BE THAT SCIENCE IS BY NO MEANS CERTAIN THAT EVOLUTION HAS REACHED ITS CULMINATING POINT IN MAN. This, however, opens up a field for discussion for which I have no time or place here.'

As to the moral development of man, the Rev. Dr. Parkes Cadman says: "The law of the righteous is working out its ends, and the salvation of man will surely be accomplished. How far away may be the complete restoration of the whole world I do not know. Perhaps it is ages away. 'There will be a time some day when there will be no jails, no prisons, no asylums, no guards over the children of men. They will have melted away and a better and purer life and a grander, perfect Christian people will walk in their stead. The world will then know no sin, no sorrow, no pain. It will be the reward in life that the Bible speaks of, and baseness and wickedness and sin will be no more.'

STATEMENT BY PROFESSOR W. J. MCGEE OF THE UNITED STATES BUREAU OF ETHNOLOGY.

IN one sense man has come to the end of his evolution as an organism. In another sense his evolution is still progressing and will continue to do so for an indefinite period.

Man has reached the limit of his development so far as the principal features of the organism are concerned. At the same time some of these features are undergoing modifications in minor ways. Take, for example, the hand. That member is in continual progress of modification among all peoples, whether savage, barbarous or enlightened; it is steadily becoming a more efficient instrument. It is developing a wider range of capability, as one may readily perceive by comparing the hand of a savage with the fore paw of an ape on the one hand and with the hand of an enlightened man on the other. Savage man has a higher range of manual movements than the ape. He can grasp a ball, which the ape cannot do, because his fingers are capable of independent movements not possible to the ape.

But compare the hand of a savage with that of a watchmaker, and it will be noticed that the latter is able to make ever so many more movements than the former. What is more important, these movements are made with a much higher degree of precision. A savage could not finish with a file a square-shanked bolt, however much his eye might be trained. Thus we find great differences in the hands of human beings, just as we discover a difference, yet more marked, between the hand of the lowest man and the hand of an ape. This is a matter of great importance, inasmuch as human development is to a great extent manual development. Brain development is the reflection of manual development. Hand and brain have gone together in the process of their evolution; they are co-ordinated in the closest way.

Just as the hands of all the peoples in the world are steadily improving, so also other progressive modifications of structure are observable in all races, showing that man has not reached the limit of his development in respect to peripheral improvements. In simpler words, the extremities are undergoing changes, by which they are made better adapted to various purposes: the muscles, likewise the tendons, and even the bones, are altering. One of the distinctive peculiarities of the human being is that he is able to rotate his forearm at the elbow. Now a savage is not able to rotate his forearm so widely as a civilized man. The articular surface of the humerus is so modified in the civilized man as to give a freer use of the limb.

How far the man of the future may be expected to be an improvement upon the man of the present can hardly be said. All that we know is that the man of the present is steadily progressing along the lines which I have indicated, and that all the peoples of the world, from the lowest to the most enlightened, are going ahead physically. With physical improvement comes naturally mental and moral betterment. The whole human race has been steadily improving, morally and mentally as well as physically, ever since its beginning. The human brain to-day seems to be a perfect and complete organ; nature does not appear to be trying to better it, but is devoting her efforts to what I have called peripheral modifications. As an illustration of this I have cited the hand.

Take the face as another illustration. One often hears it said that the Indian is a stoic; the fact is that he has not the muscular control required for facial expression. Play of features represents one of the lines of the development of civilized man. The eye movements of the Indian are less expressive and vivid than those of the enlightened man; the muscles of the lips are less mobile. The Indian and the white man move differently; the latter has a larger forehead and a bigger lower leg. In general it may be said that an advanced race always has better developed extremities than a lower race; the extremities have greater size, mobility and activity.



JOHN L. SULLIVAN AND ROMAN GLADIATOR—SHOWING MAN'S GROWTH IN MUSCULAR DEVELOPMENT.

BY DR. ALES HRDLICKA, ANTHROPOLOGIST FOR THE NEW YORK INSTITUTE OF PATHOLOGY.

EVOLUTION is now at work in a new way—in natural specialization. This is producing a race of people adapted to special occupations.

I have become strongly impressed with this from my recent physical examination of 1,400 pupils of the New York City schools.

The most striking fact which has been established is the lack of uniformity of physical development of the white children.

This is true even of children of strong, healthy parents, and of athletes. The black children are much better specimens of uniform physical development. So are North American Indian children, whom I have lately examined in the West.

But this lack of uniformity among our white population is not a retrograde or degenerate process, as might be inferred.

It means that nature is making the human organization more complex and better adapted to performing the special occupations of modern civilization. The higher the social status of a people, the greater is their diversity in physical characteristics.

This diversity of form is going on most rapidly in America of all nations. For here many nations are being welded together under the stimulus of a republican form of government. These are the circumstances that urge on the process of evolution. It has not reached its height, but is just in its beginning.

These forces will not produce a distinctive race of beings. But they will make a very high type of mankind, just as a flower is improved by scientific care and cultivation.

In this respect it is different from zoological evolution. That requires millions of years to make a distinctly new type. The process of variation which we see going on all around us we may call human evolution in distinction from zoological evolution.

It will continue in America for a long period. The geographic and climatic contrasts with their variety of resources and the diversity of trade will produce different tendencies. All these things will stimulate the process of human evolution.

One of the commonest forms of this human evolution is seen in a nation which is in reality just one big family. The nation goes through the same process as an individual. There is the period of childhood when its coming powers begin to show themselves. Then comes the period of youth or adolescence in which firmness and boldness of state policy are the rule. The Greeks of ancient times were perhaps the best example of this. Then comes the period of maturity, in which wisdom holds sway, and after that senility and dissolution.

France has gone through the first periods of human evolution, and has already arrived at the old age or senility. This is partially due to the lack of diversity of resources and climate of the country. This decline is generally recognized and thought to be due to immorality. That is entirely wrong. It is the working out of the deeper cause of evolution. Unless some other nation coalesces with France, or unless some new and as yet unseen development takes place, the nation must decline from this time on.

Germany is in the adult age. Bismarck has been the last Bismarck of the nation. The Germans will hold their own for a period. They are now cultivating colonies, and this has a tendency to rejuvenate them. Colonies contribute far more than commerce. They give new life-blood to the country to which they belong. This is the secret of Great Britain's continuous growth.

These things are no longer a theory. They are simple facts. It is the process of evolution at work right before our eyes. It is the greatest spectacle that any one can witness. No one can entirely grasp it, but every thoughtful man can see something of it. He can see its workings right in himself.

BY DR. AUGUSTUS H. BROWN, Medical Examiner of the New York Police and Fire Departments.

THERE is no doubt about the fact that there is a constant improvement going on in the human family, particularly here in America. I have had special facilities for studying such matters, both here and abroad. During a recent visit to the British Museum I paid special attention to the old armors worn in feudal days by the knights and soldiers of the sixteenth and seventeenth centuries.

It was evident to me at a glance that not one in fifty would accommodate the person of an average sized American. In no instance did I see an English armor that would fit a New York policeman. During John L. Sullivan's visit to the museums in England he observed the same condition. John L. could not get a gauntlet sufficiently large to protect his hand, and other portions of the armor were equally inadequate to cover his powerful frame. The men of that period could not have been much over five feet on an average, while the required height of New York policemen is five feet eight inches.

Civilization does much for the physical development of the human race. This is exemplified in France, where after the Franco-Prussian war the military laws were so arranged that every Frenchman was obliged to serve three years in the regular army. The result has been that the Frenchmen of to-day are better men physically than the Frenchmen of the previous generation. There has been a marked improvement.

Among the criminal class of the whole world there has also been a change for the better. I do not mean that criminals have lessened numerically. Such a condition would be out of the question, owing to the rapid growth in the population. But among those we now have to deal with, there is a physical change that speaks for the better. The purely animal features of the criminal class are disappearing, so that it may be said with truth that even they are gradually ascending toward that type of manhood that is reached through evolution.

If some wealthy man would devote his money and his life to the work of making a close study of all the tribes of the earth, from the lowest natives of Central Africa, where there are many undiscovered tribes, and pursue his labors until the highest type of Caucasian had been reached, it would go far toward establishing the theory of evolution beyond a doubt, so that all men and all creeds would have to accept it.

ton, points out that the evolution of man is going on all about us at the present moment. He says:

"Take, for example, the hand. That member is in continual progress of modification among all peoples, whether savage, barbarous or enlightened; it is steadily becoming a more efficient instrument.

"But compare the hand of a savage with that of a watchmaker, and it will be noticed that the latter is able to make ever so many more movements than the former. What is more important, these movements are made with a much higher degree of precision. A savage could not finish with a file a square-shanked bolt, however much his eye might be trained. Thus we find great differences in the hands of human beings, just as we discover a difference, yet more marked, between the hand of the lowest man and the hand of an ape. This is a matter of great importance, inasmuch as human development is to a great extent manual development. Brain development is the reflection of manual development. Hand and brain have gone together in the process of their evolution; they are co-ordinated in the closest way."

Dr. A. H. Brown, an eminent authority on physical culture and muscular development, shows that even in our physique we

Evolution Will Banish Sin From the World.

By the Rev. S. Parkes Cadman, D. D., of the Metropolitan Temple.

SINCE the earliest history, that is to say the history which records the advent of Christianity, the world has been steadily improving morally and intellectually. There has been, ever since the first coming of the Son of God, an elevating spiritual progress throughout the world. Its good effects are evident on every hand, in every clime, to the uttermost corners of the earth.

And it will go on until the word of God is the accepted word and the ten commandments will be the only laws. In certain ages, of which we know the evidences that are constantly coming to light the people of the earth were unfamiliar with the teachings that Christ subsequently brought into the world, and the tribes of the hills and valleys maintained a supremacy through combat and strife and protracted wars. The stone and the sword were the might of nations then and the victors were those who were best able to slay their adversaries.

But the Saviour came and the light of knowledge came with Him. Throughout the world, the word of God spread and bore fruit and justice and right. That was the beginning of the great work that the disciples of God have since carried on unceasingly, and that was the beginning of what to-day shines resplendent and holy above the littleness and narrowness of the unbeliever.

Onward, stride the teachings that were brought with the

Christ, and slowly but surely His high purposes are overwhelming the sin and iniquity and baseness of the world and men are kneeling under the standard of faith and good deeds wherever men are to be found. The law of God, the law of the righteous, is working out its ends, and the salvation of man will surely be accomplished ultimately. How far away may be the complete restoration of the whole world, I do not know. Perhaps it is ages away. Who knows? Even if it is a million years from now, it is sure of accomplishing its work.

There will be a time some day when there will be no jails, no prisons, no asylums, no guards over the children of men. They will have melted away and a better and purer life, and a grander, perfect Christian people will walk in their stead. The world will then know no sin, no sorrow, no pain. It will be the reward in life that the Bible speaks of, and baseness and wickedness and sin will be no more.

It will be the triumph of Christianity, the perfect peace that God has offered those who believe in Him. When that is brought about Christ will again come back to the world and the redemption will have been achieved. No man can tell how long it will take to establish this end. But to those who believe in Him, and to those who do not, I can only say, "Do all the good you can and leave the rest to God."



CHIMPANZEE DIGGER INDIAN SKILLED MECHANIC.

HOW THE REQUIREMENTS OF CIVILIZATION AND INTELLIGENCE HAVE DEVELOPED THE HAND.